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Genes encoding xylan and beta-glucan hydrolysing enzymes in Bacillus subtilis: characterization, mapping and construction of strains deficient in lichenase, cellulase and xylanase.

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The gene encoding extracellular xylanase (xynA) was amplified as a 770 bp DNA fragment from Bacillus subtilis 168 chromosomal DNA by PCR. The genes encoding endo-beta-1,4-glucanase (eglS) and endo-beta-1,3-1,4-glucanase (bglS) were isolated from a genomic library of B. subtilis 168. The sequences of xynA and eglS were identical to those of the xylanase and cellulase genes from B. subtilis PAP115. Integrative plasmids containing DNA fragments with deletions in the coding region of the genes were constructed and used to replace the chromosomal eglS, bglS and xynA genes of B. subtilis 168. Strains without any detectable activity against xylan (Xyn-), carboxymethylcellulose (Egl-) or mixed linked beta-1,3-1,4-glucan (Egl- Bgl-) were obtained. The genes were mapped at 170 degrees (eglS), 175 degrees (xynA) and 340 degrees (bglS) on the B. subtilis chromosome.

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